



*Ministero dei Trasporti
e della Navigazione*

UNITÀ DI GESTIONE
MOTORIZZAZIONE E SICUREZZA DEL TRASPORTO TERRESTRE
- MOT 2 -

Rome, 24/11/99

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IHRA Working Group on Advanced Offset Frontal Crash Protection.

Please find here enclosed the minutes of the fifth meeting of the Working Group, held in Berlin on 8-9th July 99.

Sincerely yours,

Claudio Lomonaco

INTERNATIONAL HARMONIZED RESEARCH AGENDA (I.H.R.A.)

Rome, 24/11/99

STATUS REPORT ON THE ADVANCED OFFSET FRONTAL CRASH PROTECTION GROUP

(Based on the results of the meeting held in Berlin on 8-9th July 1999)

Participants: C. Lomonaco (Chairman, Ministry of Transport of Italy), R. Lowne (EEVC), A. Lie (EEVC), K. Seyer (Federal Office of Road Safety Australia), A. Hobbs (IHRA Compatibility), D. Vetter (Technical University of Berlin), P. O'Reilly (IHRA, Compatibility), T. Hollowell (NHTSA), K. Oki (JAMA), G. Nusholtz (OICA), P. Fay (ACEA/OICA), E. Gianotti (Secretary of the Group).

DISCUSSION ON THE AGENDA OF THE MEETING

1. Extension to vehicle of category N1 (1st step)

EEVC:

According to WG16 accident studies, about the possible amendments to the front impact test procedure, EEVC proposes a first step for goods vehicle up to 2.5t. It is not proposed to include vehicles greater than 2.5 tonnes until there is an effective compatibility test.

In any case this study is submitted to the conclusions of the IHRA compatibility group.

NHTSA:

Reported that the agency has included light duty vehicles (i.e., pickup trucks, vans, and sport utility vehicles) up to 8,500 pounds for testing according to FMVSS No. 208 and frontal offset barrier procedures. Even for the light duty vehicles, agency is evaluating the opportunity of testing with 5% unrestrained female dummy using the European offset deformable barrier test procedure.

JAPAN

In Japan for current type approval full frontal crash testing, goods vehicles up to 2.8 tons are included already.

JMOT is evaluating to adopt frontal offset deformable barrier to the J-NCAP, but not for type approval at this moment.

2. Type of barrier

NHTSA

Reported that further evaluation will be carried out to try to define the geometry of the future car fleets. Cells under the deformable parts of the barrier are placed to assess the impact forces. The Agency is trying to finalize a multipurpose barrier. The intention of the agency is to deem a barrier with changing elements in order to adapt it step by step to the vehicle model changes.

Also stiffness is under study. A uniform stiffness is the opposite of the reality, particularly in the case of the offset impact.

EEVC

Is no longer in favor of the trolley test. Trolley mass must either be fixed or it must match that of the tested vehicle but it seems at the moment rather difficult to see significant advantages over the fixed barrier. From considerations of compatibility, the trolley test seems to be inferior.

According to their studies also the angle of impact does not introduce any advantage in the test.

Japan

Reported that they have stopped studies concerning the tests using vehicles with different weights at varied collision speeds.

3. Impact speed.

EEVC

Gave no further information regarding this item.

USA

The Agency deems to split the test in two procedure:

- A low severity procedure at 40km/h
- A high severity procedure at 60km/h with 5th percentile unbelted dummy.

Anyway no conclusions have been yet reached on this issue, so this first approach would probably change in the next future.

Australia

Has views for a 64km/h test speed, as a first step. Anyway the delegate advocates to consider the effects of compatibility before reaching any conclusion.

With regards to the second step, the research is not yet established.

4. Performance Criteria.

EEVC

According to conclusions of the last meeting Mr. Lowne subsequently drafted a document AFC 22a, in which injury criteria and instrumentation requirements are listed. This document was revised by the experts at the meeting. The table contained in the revised document is proposed to the group members for review, using the most recent accident analyses, so that recommendations can be based on the requirements for the draft test procedures (see doc. AFC 22a attached to the minutes)

Conclusions

For the next meeting the members are invited to collect:

- statistics and other factors available to justify changes
- priorities for the revised list

subsequently these data will be shared with the compatibility group.

5. Air-Bag performance

NHTSA

The delegate informed about the progress concerning the test. Recently the agency performed 10 further tests, data on these are not available, but a draft supplementary note will be published shortly. Anyway substantial criticism about Combined Thorax Index (CTI), as a good discriminator between more aggressive and less aggressive air-bags, arose in this last tests and the Agency will provide a more complete answer next time.

OICA

Chrysler will introduce the analyses system that it has developed.

With regard to the noise effect, induced by the Air-Bag, they are studying some models.

EEVC

While the EEVC is expecting to consider the undesirable effects of airbags related to injury, such as out of position effects, it would be unlikely to include toxicology or noise. With reference to

collateral effects, Mr. Lowne suggested a new working item for the next meeting to put into the agenda concerning the **Collateral effect of Air-Bag explosion.**

NHTSA

Presented on the behalf of the Insurance Institute of Highway Safety a study regarding the seating position for 50th percentile male Hybrid III. The findings indicated that the driver dummy clearance from the air bag module was less than 250 mm for a number of vehicles. NHTSA indicated that the issue of dummy positioning would be considered over the near future.

6. Impact angle.

EEVC

The angle of impact influences the structure. The EEVC views have not changed on this issue. The angle is exclusively related to a trolley test. This last induces problems in repeatability. It is more practical than theoretical to have an angle test.

NHTSA

There are no news on this issue. It should be fixed up to 20°. A paper concerning the last news on this definition should be delivered within August.

OICA

Have no clues to suggest anything on this item. OICA advocates a rigid barrier than an angle barrier, because it is better to set the Air-Bag.

NHTSA

Is also in favor of an offset test to represent different kind of accidents, to test the vehicle structure and to demonstrate the effects of mass.

OICA

Says that two regulatory tests involve two different barriers and technological complexity.

NHTSA

The major issue related by the trolley test is the compatibility.

EEVC

Insisted to decide as soon as possible to use or not the trolley test.

7. Trolley

The table concerning the Trolley based Frontal Offset Impact Test procedure, was slightly changed as follows:

ADVANTAGES	ALTERNATIVE APPROACH TO ACHIEVE SAME ADVANTAGE WITH FIXED BARRIER
1. The acceleration pulse, DV and energy distribution is representative of real world serious injuries.	No known alternative.
2. Takes into account the effects of the Mass Ratio of the vehicles.	Change impact speed with vehicle mass.
3. Can include angular effects on the deformation and intrusion characteristics.	No known alternative.
4. Can include a possible measure of Compatibility (by, for instance, measuring the vehicle and/or trolley acceleration)	Measure the force on the fixed barrier behind the deformable face.
Disadvantages	POSSIBLE ACTIONS TO REDUCE THE DISADVANTAGE
1. Complex test procedure for "moving barrier-moving car" (such as high speed trolley bounce. Possible overriding and others).) Reduce complexity by testing co-linearly and/or using moving barrier to stationary car. Explore methods of reducing artificial overriding.
2. Repeatability of more complex test may be poor (for angled moving barrier-moving car)	
3. Difficulties to video record impact effects between trolley and stationary car during the development of the vehicle.	Mount the camera on the vehicle
4. Limited number of test laboratories with capability to perform trolley-to-vehicle testing.	Minimise the complexity of the test and/or improve capability of test institutes.
5. Unknown ground and other interaction effects, especially if one vehicle stationary while the other travels at higher speed – to represent both vehicles moving.	Investigate
6. Need to agree on a harmonized barrier mass, stiffness and geometry when vehicle fleet differ internationally.	Agree to differ

8. Conclusion of the meeting

Discussion during the meeting had demonstrated clear differences of opinion regarding the use of a fixed or mobile barrier for the offset test, particularly regarding the influence on compatibility as well as on 'self protection'. In an effort to help in resolving this issue, the chairman on the IHRA Compatibility WG invited members of the Advanced Offset frontal crash protection WG to attend one day of the next two day Compatibility WG meeting to be held in San Diego. It was agreed that those members of the Frontal WG who were able to attend would participate in the discussions on Friday Oct 29th. Which would be devoted to the topic of the merits of fixed and mobile barriers. Mr Lowne agreed to produce a discussion document to assist with the discussions.

It was advocated by several members of the group that a formal joint meeting with the compatibility group should subsequently be held. A day of overlap of the meeting of the two group will be fixed in the next convocation.

The date of the next meeting is scheduled on 16-17th November 1999 in Delft (Holland) by TNO.

LIST OF CLASSIFIED DOCUMENTS

- **IHRA/AFC-22 Injury Assessment R Lowne [EEVC]**
- **IHRA/AFC-23 Standard Seating Position for 50th Percentile Male Hybrid III (Adrian Lund)**
- **IHRA/AFC-24 Frame and Body characteristics of motor vehicles for carriage of goods (Japan Type Approval Handbook – Safety Regulation).**